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AN EVALUATION OF THE FOUR YEAR PROGRAM IN DIVISION 1
AS FOLLOWED
BY THE CALGARY PUBLIC SCHOOLS

A Thesis
Presented to
the Faculty of Graduate Studies
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Master of Education

by
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ABSTRACT

The Four Year Program is an attempt on the part of the Calgary Public School Board to provide for slow-learners in Division 1. Its success in the field of subject-matter achievement has been measured by means of tests in arithmetic, reading, and spelling. There may be other aspects of the program, beneficial or not, which have not been measured.

In order to evaluate the achievement of pupils in the program a group of Four Year pupils was matched with a group of Repeaters. The matching was done on a basis of sex, and mental age. The achievement of each group in the subjects mentioned was then calculated and means and standard deviations found. The t-test for matched groups was used to see if significant differences existed between the groups.

A group of Three Year pupils was set up by taking a random sample of the population, stratified on the basis of sex. The achievement of this group was determined and compared with that of the Four Year Group. Differences were noted.

Investigation showed no significant difference between the Four Year Group and the Repeaters, in any of the subjects tested. There was a slight indication that

the subject of arithmetic was being covered better by the Four Year Group.

The Three Year Group proved to be significantly higher than the Four Year Group in all subjects. There was some indication that the Four Year Group reached a reasonable Grade III level in arithmetic. Reading achievement fell below that of arithmetic. The achievement in spelling fell very low when compared to that of the Three Year Group.

It was concluded that the Four Year Program attained some degree of success in the field of achievement. This success was highest in arithmetic, and lowest in spelling where it appeared not to exist.

Factors which might possibly have a bearing on lack of higher achievement of the Four Year Group were examined and recommendations made. These recommendations suggested ways in which the Program might be aided.

It should be noted that the total effect of the Program has not been measured. It is suggested that further study be made of all aspects of the Program before a complete evaluation is attempted.

In conclusion, it is recommended that the Four Year Program be carefully conducted under supervision, to discover methods of improvement in both organization and instruction. Attention should be given to frequent evaluation of its progress.

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TABLE OF CONTENTS

CHAPTER	PAGE
1. THE PROBLEM	1
Statement of the Problem	1
Background of the Problem	1
Need for the Study	3
Definition of Terms	4
Three Year Program	4
Four Year Program	4
Repeaters	5
Slow Learners	5
Limitations of the Study	6
11. REVIEW OF RELATED LITERATURE	7
Individual Differences	8
Grouping	11
The Slow Learner	14
Organizing For Slow Learners	16
Grouping Procedures	17
Curriculum Adjustment	18
Summary	20
111. SOURCES OF DATA AND METHOD OF GROUPING	21
Sources of Data	21
Achievement Test Data	21
Measuring Power in Arithmetic	22
Dominion Achievement Test in	
Silent Reading	22
Edmonton Spelling Test	22

CHAPTER	PAGE
Intelligence Test Data	23
California Short Form Test of Mental	
Maturity	23
Program Placement	23
Method of Grouping	23
The Repeater Group	23
The Four Year Group	24
The Three Year Group	24
IV. ANALYSIS OF THE DATA	25
Preliminary Steps	25
Testing Significance	25
Results of Analysis	26
V. CONCLUSIONS AND RECOMMENDATIONS	34
The Four Year Group and The Repeaters	34
Achievement	34
Un-Measured Factors	35
The Four Year Group and The Three Year Group	36
Arithmetic	36
Reading	37
Spelling	38
VI. SUMMARY	41
BIBLIOGRAPHY	53

LIST OF TABLES

TABLE	PAGE
1. Composition, and Matching of Groups	24
11. Test Results: Group Means and Standard Deviations	27
111. Correlation Between Mental Age and Test Results of the Three Year Group	27
1V. Significance of Differences in Arithmetic Four Year Group and Repeaters	28
V. Significance of Differences in Reading Four Year Group and Repeaters	28
VI. Significance of Differences in Spelling Four Year Group and Repeaters	29
VII. Significance of Differences in Arithmetic Four Year Group and Three Year Group ...	29
VIII. Significance of Differences in Reading Four Year Group and Three Year Group ...	30
IX. Significance of Differences in Spelling Four Year Group and Three Year Group ...	30

LIST OF FIGURES

FIGURE	PAGE
1. Cumulative Frequencies of Arithmetic Scores of Each Group	31
2. Cumulative Frequencies of Reading Scores of Each Group	32
3. Cumulative Frequencies of Spelling Scores of Each Group	33

CHAPTER 1

THE PROBLEM

1. STATEMENT OF THE PROBLEM

The purpose of this study was to evaluate the success of the Four Year Program in Division 1, Calgary Public Schools, as measured by achievement in certain subject-matter fields. The evaluation was carried out with two questions in mind:

1. Does the Four Year Group achieve in a manner significantly different from the Repeater Group?
2. Does the Four Year Group achieve at a level comparable with the Three Year Group?

11. BACKGROUND OF THE PROBLEM

In September 1952 the Four Year Program for Division 1 was introduced into the Calgary Public Schools. It was designed for slow learners, to permit them to progress through Grades One, Two, and Three, at a slower rate than the average learners. It would thus be possible for them to avoid the need for repetition of one of these grades. To enable them to do this, the curriculum of the first three grades was examined and the subjects of reading, arithmetic, and spelling were selected for

special attention. The subject matter of these subjects was divided into twelve units, or levels, and organized so that Three Year pupils would be expected to complete four units each year in Division 1. The Four Year Group was expected to cover three units each year. It would therefore take this group four years to cover the course.

Selection of candidates for this program was to be governed by several factors. Low I.Q. was to be considered, but mental age seemed to give a better indication of maturity, so this measurement was given considerable weight. These indications of ability were obtained by the use of the Detroit Beginning First Grade Intelligence Test, early in September of the Grade 1 year. Achievement was to be determined by the teacher during the first months of school. A pupil who fell behind by the end of the Grade 1 year was also considered for placement in the Four Year Program. If achievement was very low, or poor because of causes other than a low learning rate, the child was obliged to repeat the grade.

Selection of pupils for the program thus depended partly upon objective measurement, and partly upon the subjective judgment of the teacher.

Under this organization, the Four Year Program was initiated and it has been in operation for a period of six years.

111. NEED FOR THE STUDY

The Four Year Program has now been in operation since September, 1952. Several groups of pupils have completed the four years required, and have been promoted to Division 11. It should be possible at this time to obtain a measurement of the success of the program.

The operation of the program requires willing and able teachers, who have been trained to follow the special procedures. The principal, also, must study, plan, and organize, to follow the program in his school. He must supervise its operation throughout the year to be sure that it is progressing in a satisfactory manner. To justify the extra burden of work upon the staff, the program should provide advantages not obtainable by repetition of a grade. This study might determine whether such advantages are provided or not. The knowledge obtained would be of value in deciding whether the program should be continued, modified, or discontinued.

Throughout the report of this investigation, it must be remembered that only one aspect of the program is examined, that of achievement in certain subject-matter fields. Other aspects should also be considered before definite conclusions are reached regarding the total value of the program.

1V. DEFINITION OF TERMS

Three Year Program. The regular program of studies followed in the normal course by the majority of Division 1 pupils is designated as the Three Year Program. It is carried on in three grades, each grade requiring one school year to complete. The progression is from Grade 1 to Grade 11, to Grade 111.

Four Year Program. A special program for slow learners has been devised in Calgary. This program is officially known as the Four Year Program. It is an adaptation of the same program of studies followed by the Three Year Group. That program is divided into twelve units in each of the basic subjects. Pupils in the Four Year Program are expected to cover three of these units, or levels, each year. It therefore takes four consecutive years to cover Division 1, progressing from Grade 1 to Junior 11, to Senior 11,

and to Grade III. The subjects organized in this manner are arithmetic, reading, and spelling.

Repeaters. In this study the term Repeater refers to a pupil who was required to repeat the work of any one grade in Division I. Sometimes pupils have failed to achieve because of poor health or low attendance. Sometimes others have failed because they were very weak learners who lacked sufficient basic skills to progress even in the slower route. Repetition of the grade was considered best in these cases. Repeaters also spent four years in Division I, but they did not follow a continuous program.

Slow Learners. Slow learners, only, are to be selected for the Four Year Program. They are described in instructions to teachers as pupils of low I.Q., 80 or under, and pupils of low achievement.¹ They are to be identified by, "the child's rate of progress in the skill subjects; reading, arithmetic, and writing, combined with careful consideration of the Detroit Test scores."²

¹Calgary Public School Board, Teacher's Handbook, 1956, p.13.

²Calgary Public School Board, Promotion Reports, 1956, p.2.

V. LIMITATIONS OF THE STUDY

This study is limited to the pupils who were promoted from Grade III to Grade IV in June, 1958, in the Calgary Public Schools. No pupils were included who took more than four years to complete the work of the division. Pupils in the Accelerated, or Two Year Program, were not involved.

The success of the Four Year Program could be measured in various ways. Its effect upon the social and emotional life of the child might be either good or bad. Perhaps the stigma attached to repeating a grade is avoided. Perhaps there are advantages to be obtained in proceeding with a group of mental peers. These are worthy considerations, but they are not examined here. Only one phase of the program receives attention, that of achievement in subject matter. The subjects observed are arithmetic, reading, and spelling and observations were confined to the scores on one battery of achievement tests.

All conclusions drawn concerning the value of the Four Year Program are based upon these considerations. A complete evaluation of the program would require investigation of other factors.

CHAPTER 11

REVIEW OF RELATED LITERATURE

There are a number of basic assumptions and convictions which form the philosophy behind the Four Year Program. Several aspects of the educational growth of the child have received the attention and study of many authorities on learning. Upon investigation of the available literature it is soon discovered that many opinions are expressed which have not been proven experimentally. In certain instances there is such unanimity of opinion that one must give considerable credence to it; in others, the opinion expressed seems to be confined to one person only, and should therefore not be valued too highly.

Another group of investigators has studied the various problems in a scientific manner and can provide conclusions based upon factual evidence. These conclusions carry considerable weight, but further investigation is sometimes necessary before complete acceptance is possible.

Both types of literature have been examined in the fields covered by this study. Their relationship to the Four Year Program is significant.

The areas investigated will be dealt with in four sections covering individual differences, grouping, the slow learner, and organization.

1. INDIVIDUAL DIFFERENCES

Education authorities universally agree that children differ in ability. It is readily accepted that individual differences exist even among children of similar age and sex. Great advances in the scientific movement in education took place when this concept was accepted. The importance of this acceptance is summed up in the following quotation,

As more and more became known through discoveries and experimentation, the principle of individual differences came to assume such an important place that no educational procedure is now possible of arrangement or research dealing with instruction, unless certain variations among children are first taken into consideration.¹

The existence of individual differences is also acknowledged by Gates, et al., who say that differences in the ability to do reflective thinking are differences in degree.² There is no sharp division between those who can reason and those who can not.

¹W. A. Yeager, Administration and the Pupil, New York: Harper and Brothers, 1949, p.43.

²Arthur Gates, et al., Educational Psychology, New York: The MacMillan Co., 1949, p.475.

Hightower studied the results of Stanford Achievement Tests given to 307 pupils in the Seventh Grade, finding a range in ability from 2.9 to 12.9 in mental age.³ In Alberta, a similar study showed that the average range of reading achievement, expressed in grade scores, was five grades, while that of spelling was six grades. The range in arithmetic was also five grades.⁴

These great spreads in grade level suggest that instruction should be given on an individual basis. Where such individual instruction is impossible, schools must seek a compromise of some kind. This is usually found in some method of grouping.

The Calgary Public School Board, in a message to parents, indicates that the philosophy behind the Four Year Program is based upon this concept of individual differences. The message states, "It is important that experiences which are offered to the

³Howard W. Hightower, "Individual Differences," Educational Administration and Supervision, 41:8, December, 1955, p.458.

⁴G. M. Dunlop, S. Hunka, and H. Zingle, "Individual Differences in Alberta Schools," The Alberta Journal of Educational Research, 1:4, December, 1955, pp. 9 - 10.

child fit his own maturity level."⁵ This is further elaborated in instructions to teachers stating, "In every class a teacher will find that there is a wide range in the achievement, the ability, and the learning rates of the individuals who compose the class."⁶

In order to deal with individual differences it is necessary to discover these differences. This is usually done by means of standardized tests. In Calgary, the test used in Division 1 is the Detroit Beginning First Grade Intelligence Test. This test has been investigated by Powell in order to test its validity. Conclusions reached indicate that the test does discriminate the levels of intellectual ability.⁷ It thus seems to be a suitable test to use in order to locate possible candidates for the Four Year Program.

⁵ Calgary Public School Board, Organization for Effective Learning, 1954, p.2, citing Gladys Jenkins et al., These Are Your Children, Chicago: Scott Foresman and Co., 1949, p.13.

⁶ Calgary Public School Board, Teacher's Handbook, 1956, p.13.

⁷ Frederick Powell, "A Critical Evaluation of the Detroit Beginning First Grade Intelligence Test," The Alberta Journal of Educational Research, 11:1, March 1956, p.30.

11. GROUPING

In the modern school, with its tendency towards crowded classrooms, it is impossible to provide individual instruction. The compromise solution is to group pupils of similar ability and attainment, a procedure which has found favor with many educational experts. Various methods of grouping have been developed with a definite tendency towards providing for a degree of homogeneity within the group.

Monroe bases grading for purposes of instruction on the course of studies, and states,

At any stage the object of a system of grading is to produce groups or classes that are fairly homogeneous as regards attainments at the moment, and also capacity to make a certain rate of progress throughout the course of study as organized.⁸

Some authorities do not agree that ability grouping is completely successful. In his examination of research on the subject of class organization, Wrightstone pointed out that opponents of ability grouping stated that it produces relatively small change in the range of individual differences, and

⁸ Monroe (Ed.), "Grading and Promotion"
A Cyclopaedia Of Education, New York: The MacMillan Co.,
1918, p.26.

that many differences in academic achievement continue.⁹ He concluded, "Thus far, research indicates that so-called homogeneous grouping is seldom very satisfactory."¹⁰ An Alberta study also agreed that although some lessening of the range of achievement was achieved by grouping, this reduction was not great.¹¹

Despite these adverse opinions, the majority of experts seem to favor the practice of homogeneous grouping. In a study of professional opinions on the matter of grouping, Sauvain showed that, "About seven out of eight school officials believe that better work is done under ability grouping at both the brighter and slower levels, than would be done without it."¹²

⁹ J. W. Wrightstone, "What Research Says About Class Organization For Instruction," National Education Association Journal, XLVI:4, April, 1957, p. 254.

¹⁰ Ibid., p. 254.

¹¹ S.C.T. Clarke, "The Effect of Grouping on Variability in Achievement at the Grade 111 Level," The Alberta Journal of Educational Research, 1V:, September, 1958, p. 170.

¹² W. H. Sauvain, A Study of the Opinions of Certain Professional and Non Professional Groups Regarding Homogeneous Ability Grouping, New York: Teacher's College, Columbia University, 1934, p. 45.

Among other writers, both Pittenger¹³ and Reeder¹⁴ favor some type of homogeneous grouping.

The following reason for grouping is given by Ingram,

The purpose of the grouping is to allow children to work according to their ability, and thereby eliminate as much as possible failure and repetition of grades for the slow-learner and give added opportunities for the superior.¹⁵

The policy of homogeneous grouping has been adopted by the Calgary Public School Board, as indicated by the statement, "In an effort to meet the needs of individual pupils several programs have been organized for use in our schools."¹⁶

13

B. F. Pittenger, Local Public School Administration, New York: McGraw Hill Book Co., 1941, pp. 298-9.

14

W. G. Reeder, The Fundamentals of Public School Administration, New York: The MacMillan Co., 1941, pp. 497-516.

15

Christine P. Ingram, Education Of The Slow-Learning Child, New York: World Book Co., 1935, p. 304.

16

Calgary Public School Board, Teacher's Handbook, 1956, p. 13.

111. THE SLOW LEARNER

It is now necessary to examine the term slow-learner. Most writers agree that this term applies to those pupils somewhat below the normal intelligence, but still capable of reasonable achievement. In her reference to the term Ingram states,

These pupils are very roughly indicated as those having intelligence quotients of from about 70 or 75, to 89, as determined by performance in intelligence tests. They comprise approximately 15 to 18 percent of the total school population.¹⁷

The slow learner is defined by Featherstone as follows,

There is no fixed standard or level of ability below which a pupil must be called a slow learner, but in common practice pupils with an I.Q. below 91 and above 74 are so labelled. ... the term slow learner should be interpreted consistently to mean slow in learning intellectual things.¹⁸

Kennedy-Fraser distinguishes between temporarily backward, I.Q. 100 or over, and permanently backward I.Q. below 80. There is an inference here that pupils needing remedial work are not necessarily slow learners and should not be treated in the same way. Methods of

¹⁷

Ingram, op. cit., p. 389.

¹⁸

W. D. Featherstone, Teaching The Slow Learner, New York: Bureau of Publications, Columbia University, 1941, p. 3.

diagnosis are discussed, and the opinion is expressed that the teacher is in a most strategic position for discovering the slow learner. Investigation into social and medical background are suggested as a supplement to the use of intelligence tests.¹⁹

Since considerable attention is paid in Calgary to teacher judgment, his summary statement is significant,

... The teacher should not hesitate to place considerable reliance on his own subjective judgment, particularly after he has a good background of practical experience, and after he has come to know the pupils pretty well in the intimate face-to-face relationship of the classroom.²⁰

Maclin applies the term slow learners to children of limited intelligence range from 70 to 90 in the Binet test range.²¹ Burt includes approximately the same range in his definition. He enumerates the causes of backwardness under the headings of Social Conditions, Physical Conditions, Sensory Conditions, Motor Defects,

19

David Kennedy-Fraser, Education Of The Backward Child, London: University of London Press, 1932, p. 18.

20

Ibid., p. 18.

21

Gladys Maclin, "Differentiation of Courses of Study in Denver for Slow Learning Children," Elementary School Journal, 30:2, October, 1929, p. 104.

Intellectual Factors, Temperament, and Character.²²

The Calgary Public School Board, in its directions to teachers, suggests that pupils of low I.Q., 80 or under, and pupils of low achievement be considered slow learners and included in the Four Year Program.²³ In this case, selection contains both subjective and objective elements.

IV. ORGANIZING FOR SLOW LEARNERS

In most school systems it has been customary to require pupils to repeat grades if they failed to reach a satisfactory degree of achievement by the end of the term. This practice still operates to some extent, but opinion is growing that little is to be gained by this method except in special cases.

Clarke studied promotion practices in Alberta schools and found a high rate of failure in Grade 1. He also found that there was little or no provision made for accommodating children of retarded or

22

Cyril Burt, The Backward Child, London: University of London Press, 1937, pp. 85-563.

23

Calgary Public School Board, Teacher's Handbook, 1956, p. 13.

accelerated achievement.²⁴ The Alberta Department of Education also called attention to the fact that non-promoted pupils do not achieve as well as potential repeaters who are promoted.²⁵ This concept is reiterated by Wrightstone, who declares that children do not learn more by repeating a grade.²⁶

With most authorities agreeing that non-promotion and repetition of a grade are not particularly beneficial, other procedures are sought to improve the teaching of slow learners.

Grouping Procedures

Many authorities think that slow learners should be separated from the more rapid learners for the purpose of instruction. Burt notes that this may be done within a class, by means of special classes, or by means of special schools.²⁷ Kennedy-Fraser favors segregation, "Therefore we argue for the segregation

²⁴

S. C. T. Clarke, "Promotion Practices and Policies in Alberta Schools," The Alberta Journal of Educational Research 1:4, December, 1955, p. 24-34.

²⁵

Department of Education, Alberta, Promotion Policies Report, 1955, p. 12.

²⁶

Wrightstone, op. cit., p. 254.

²⁷

Burt, op. cit., p. 574.

of the upper and lower levels of intelligence from the normal."²⁸ He indicates that, "There are several types of organization on a so-called "multiple-track" plan, where provision is made for all grades of intelligence."²⁹ This type of organization provides a background for Calgary's Four Year Program.

Charvo, writing about exceptional children, was in favor of segregation within the school, She writes,

The needs of the majority of mentally retarded pupils will best be met in special classes in a regular school situation, where these classes are offered as a special service and considered as part of, and not apart from the regular school program.³⁰

Curriculum Adjustment

There appears to be general agreement that the curriculum for slow learners requires special consideration. Two plans are given concerning curriculum by Ingram. She states that one possibility is a slowed-down program that allows the slow learner extra time

²⁸

Kennedy-Fraser, op. cit., p. 56.

²⁹

Ibid, p. 67

³⁰

Mayme Charvo, and Dorothy Hamlin, "Considerations in Adjusting the Instructional Program for Exceptional Children," California Journal of Elementary Education XXV: May, 1957, p. 223.

in the elementary school to complete the minimum essentials for entrance to Junior High School. The other plan requires lowered requirements. In either case there is an adaption of the curriculum.³¹ The desirability of adaptation of the curriculum to the needs of different ability levels is also stressed by Sauvain.³²

Monroe suggests slowing down the program, mentioning a system of grading so devised that groups proceed along parallel lines. This system was known as the Cambridge system, and it could be systematized so that a given course of study would be completed in respectively seven, eight, or nine years, so far as given individuals were concerned.³³

The Calgary Public School Board has adopted two of the approaches mentioned. It has grouped the slow learners, and has organized a slowed-down program which is known as the Four Year Program.

³¹ Ingram, op. cit., p. 394

³² Sauvain, op. cit., p. 61.

³³ Monroe, op. cit., p. 126.

V. SUMMARY

From opinion and research certain general conclusions may be drawn.

1. Individual differences exist among school children and these differences require special attention. They may be discovered by the use of standardized intelligence tests, supplemented by teacher observation and judgment.

2. Grouping of children of similar ability is accepted by many as an aid in providing for individual needs.

3. Slow learners have been frequently identified as pupils with I.Q.'s of approximately 70 to 90. Low achievement is a secondary indication of slow learning.

4. Slowed-down programs have had some acceptance as a means of dealing with slow learners.

5. Organization of alternative routes for children of varying abilities has provided another means.

These conclusions are apparent in the development of the Calgary Public School Board's Four Year Program for slow learners in Division 1.

CHAPTER 111

SOURCES OF DATA AND METHOD OF GROUPING

The variables measured in this study were arithmetic, reading, and spelling. The nature of the data used, and the sources from which they were obtained, are given in detail below. The investigation was confined to three groups, a normal Three Year Group, a Four Year Group, and a Repeater, or control group. The Four Year Group and the Repeater Group were matched. A complete explanation of the formation of these groups is given in this chapter.

1. SOURCES OF DATA

All data were collected from official files of the Calgary Public School Board. They were obtained from reports dealing with achievement tests, intelligence tests, and year-end promotions.

Achievement Test Data

All Grade 111 classes in Calgary were given achievement tests in May, 1958. These were administered and scored by the classroom teachers. Each school sent records of these tests to the Calgary School Board Office where they were filed. From these official records a copy of all scores were obtained to provide a basis for this study. The tests covered the subjects of arithmetic, reading, and

spelling. An outline of the tests used is given below.

Measuring Power in Arithmetic.¹ The tests were prepared for use in grades three to eight. They consisted of three sections entitled.

1. Understanding Arithmetic.
2. Using Arithmetic Accurately.
3. Solving Problems.

The scores made in each part were added together to get a total score. This total was the official score filed with the School Board Office. There was a possible score of 125.

The Dominion Achievement Test in Silent Reading.² This test was prepared for grades 111 and 1V, and was essentially a diagnostic test in paragraph reading. Raw scores on the test were used for record purposes, the total score being 28.

Edmonton Spelling Test.³ The test for Grade 111 was used, containing a possible score of 40. Raw scores were used on the reports.

¹
R. L. Morton, Measuring Power in Arithmetic, Grades Three to Eight, New York: Silver Burdette Co., 1954.

²
Department of Educational Research, Ontario College of Education, Achievement Tests in Silent Reading, Type 11 Toronto: University of Toronto Press, 1953.

³
Edmonton Public School Board, Spelling Test, Grade 111, Unpublished.

Intelligence Test Data

California Short Form Test of Mental Maturity.⁴

This test provided the data on mental age. It was given to all Grade 111 pupils in May, 1958. Mental ages were used in matching groups as these measures are used in Calgary when arranging for group work.

Program Placement

Data concerning pupil placement in the Three Year Program, the Four Year Program, and the Repeaters, were obtained from the individual school promotion records which are filed each year in the School Board Office. This involved the examination of complete city records for the years 1955, 1956, 1957, and 1958. The names of 2662 pupils in the Three Year Program, 139 in the Four Year Program, and 104 Repeaters were obtained. At this stage care was taken to exclude names of any accelerated, or Two Year pupils, pupils who took more than four years in Division 1, and pupils who were not being promoted in June, 1958.

11. METHOD OF GROUPING

The Repeater Group

The total population of repeaters was obtained from the promotion records. This group totaled 104 but the number was reduced to 100 during the process of matching with the Four Year Group. The matching of the two groups was done on a basis of sex and mental age.

The Repeater Group finally consisted of sixty-two boys and thirty-eight girls with a mean mental age of 112.15, and a standard deviation of 11.80. The proportion of boys to girls in the group was a result of the number of cases available. Mental ages were calculated in months.

The Four Year Group

From the 139 Four Year pupils, 100 were selected. Matching of the sex distribution of the Repeater Group was accomplished by including sixty-two boys and thirty-eight girls. When the final group was obtained it had a mean mental age of 112.15, and a standard deviation of 11.70.

The Three Year Group

To select the Three Year Group, the test results of all schools were arranged alphabetically by pupils. A stratified random sample of sixty-two boys and thirty-eight girls was obtained, consisting of pupils who had taken three years. The proportion of boys to girls was kept the same as in the other two groups.

The composition of the three groups is shown in Table 1.

TABLE 1

COMPOSITION AND MATCHING OF GROUPS

Group	Population	Number Selected			Mean M.A.	Standard Deviation
		Boys	Girls	Total		
Three Year	2662	62	38	100	116.70	10.95
Repeaters	104	62	38	100	112.15	11.80
Four Year	139	62	38	100	112.15	11.70

CHAPTER 1V

ANALYSIS OF THE DATA

1. PRELIMINARY STEPS

The first step in the treatment of the data was to list all test scores for the pupils in each group. These scores consisted of mental age, arithmetic raw score, reading raw score, and spelling raw score. Means and standard deviations were then found for each group. Table 11 shows these figures.

In order to compare results by means of the t-test for matched groups it was then necessary to find the correlation between mental age and achievement as shown by the Three Year Group. These correlations were obtained for mental age and each of the subjects tested. Table 111 presents these relationships.

As a supplementary means of comparison, cumulative frequency graphs were prepared, showing group achievement in each subject. Figures 1, 2, and 3, show these graphs.

11. TESTING SIGNIFICANCE

The t-test for matched groups was used to discover the significance of differences between the Four Year

Group and the Repeater Group. In the case of arithmetic, the difference between the means of the two groups was found, and the standard error of this difference was obtained by the formula for groups matched for mean and standard deviation. The value of t was then calculated, and the tables used to find the significance of the difference. The same procedure was repeated for reading, and spelling.

Since the Four Year Group and the Three Year Group were not matched, the standard error of the difference for unmatched groups was used in the calculation of the t value.

111. RESULTS OF ANALYSIS

The use of the t -test showed that there was no significant difference between the Four Year Group and the Repeaters in any of the subjects tested, at the .05 level. The cumulative frequency graphs show a similarity of achievement of the two groups, with some apparent superiority on the part of the Four Year Group in arithmetic.

In the comparison of the Four Year Group and the Three Year Group significant differences appeared at the .01 level. The cumulative frequency graphs show a much higher achievement by the Three Year Group than that

attained by the others.

The results of this analysis are recorded in Tables 1V, V, VI, VII, VIII, and IX, and in Figures 1, 2, and 3.

TABLE 11
TEST RESULTS, GROUP MEANS AND STANDARD DEVIATIONS

Group	Mental Age		Arithmetic		Reading		Spelling	
	M	σ	M	σ	M	σ	M	σ
Three Year	116.70	10.95	98.1	17.2	18.76	4.48	22.10	4.06
Repeaters	112.15	11.80	84.6	20.7	13.38	5.14	16.58	5.14
Four Year	112.15	11.70	87.3	19.7	12.84	5.60	16.20	4.78

TABLE 111
CORRELATION BETWEEN MENTAL AGE AND TEST RESULTS
OF THE THREE YEAR GROUP

Arithmetic	$r = .44$
Reading	$r = .27$
Spelling	$r = .07$

TABLE IV
SIGNIFICANCE OF DIFFERENCES IN ARITHMETIC
FOUR YEAR GROUP AND REPEATERS

Group	N	Mean	σ	Difference of Means	t	Significance
Four Year	100	87.3	19.7	2.7	1.05	Not significant at .05 level
Repeaters	100	84.6	20.7			

TABLE V
SIGNIFICANCE OF DIFFERENCES IN READING
FOUR YEAR GROUP AND REPEATERS

Group	N	Mean	σ	Difference of Means	t	Significance
Four Year	100	12.84	5.60			Not Significant at .05 level
Repeaters	100	13.38	5.14	.54	.74	

TABLE VI
SIGNIFICANCE OF DIFFERENCES IN SPELLING
FOUR YEAR GROUP AND REPEATERS

Group	N	Mean	σ	Difference of Means	t	Significance
Four Year	100	16.20	4.78			
Repeaters	100	16.58	5.14	.38	.54	Not significant at .05 level

TABLE VII
SIGNIFICANCE OF DIFFERENCES IN ARITHMETIC
FOUR YEAR GROUP AND THREE YEAR GROUP

Group	N	Mean	σ	Difference of Means	t	Significance
Four Year	100	87.3	19.7			
Three Year	100	98.1	17.2	10.8	4.12	Significant at .01 level

TABLE VIII
SIGNIFICANCE OF DIFFERENCES IN READING
FOUR YEAR GROUP AND THREE YEAR GROUP

Group	N	Mean	σ	Differ- ence of Means	t	Significance
Four Year	100	12.84	5.60			Significant at .01 level
Three Year	100	18.76	4.48	5.92	8.08	

TABLE IX
SIGNIFICANCE OF DIFFERENCES IN SPELLING
FOUR YEAR GROUP AND THREE YEAR GROUP

Group	N	Mean	σ	Differ- ence of Means	t	Significance
Four Year	100	16.2	4.78			Significant at .01 level
Three Year	100	22.1	4.06	5.9	9.4	

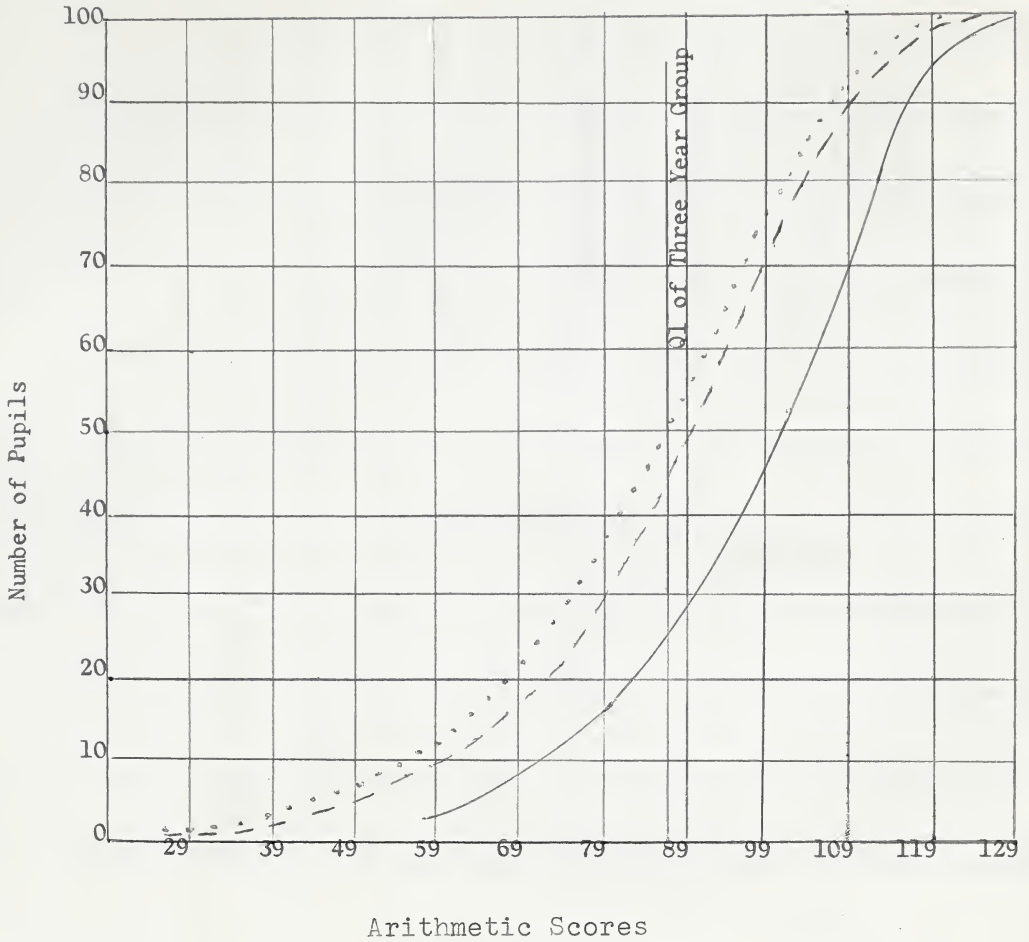


FIGURE 1
CUMULATIVE FREQUENCIES OF ARITHMETIC SCORES
OF EACH GROUP

THREE YEAR GROUP _____
FOUR YEAR GROUP - - - - -
REPEATER GROUP

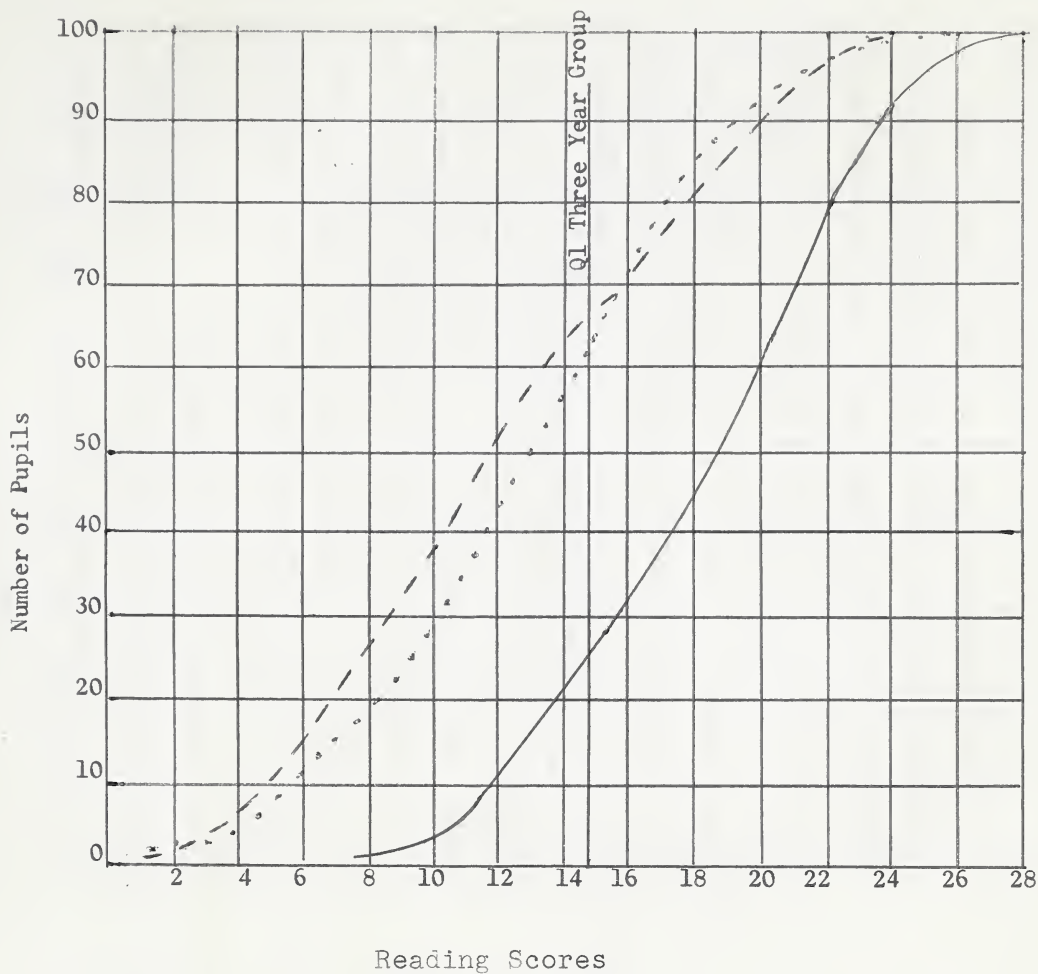


FIGURE 2
CUMULATIVE FREQUENCIES OF READING SCORES
OF EACH GROUP

THREE YEAR GROUP _____

FOUR YEAR GROUP - - - - -

REPEATER GROUP

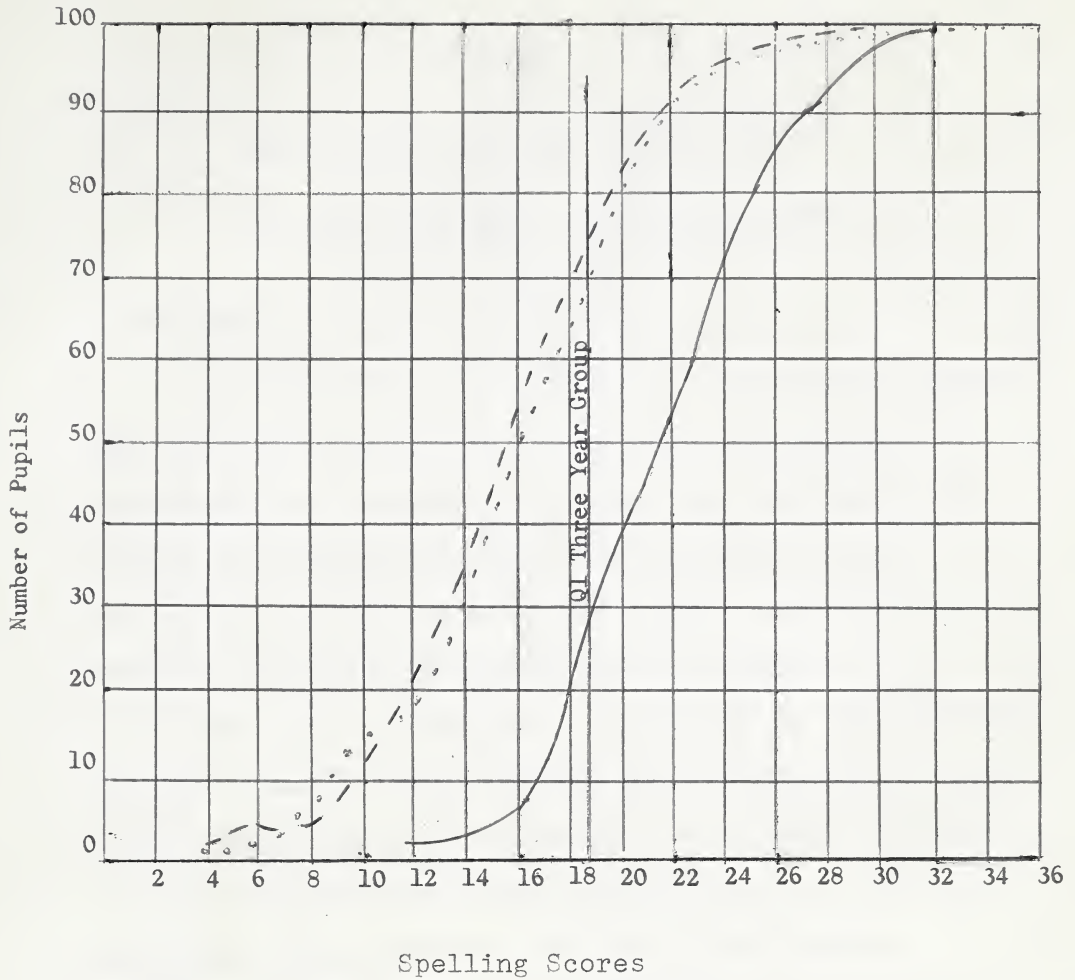
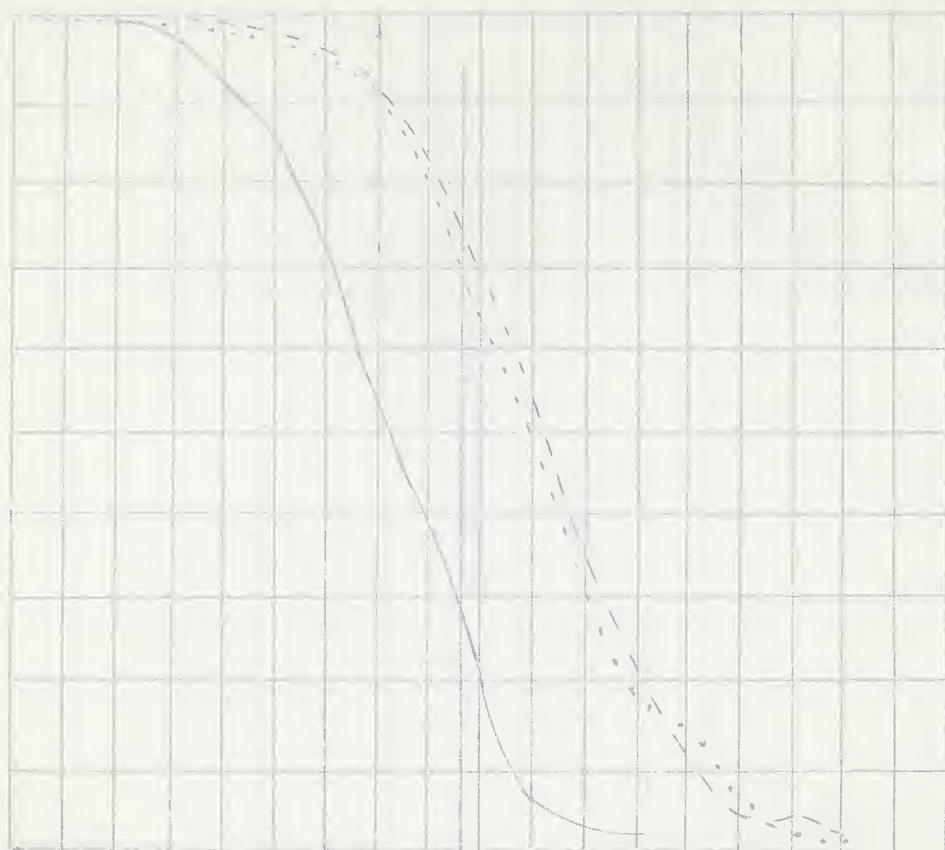


FIGURE 3
 CUMULATIVE FREQUENCIES OF SPELLING SCORES
 OF EACH GROUP

THREE YEAR GROUP _____
 FOUR YEAR GROUP - - - - -
 REPEATER GROUP



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

1. THE FOUR YEAR GROUP AND THE REPEATERS

ACHIEVEMENT

The data show that there is no significant difference between the Four Year Group and the Repeaters in achievement in arithmetic, reading, and spelling. This appears to indicate that the Four Year Program, as it is presently operating, does not provide a better means of progress than does the repetition of a grade.

The lack of difference may be due to the possibility that some Four Year classes may suffer, by not being taught according to the philosophy underlying the program. In some instances very small groups exist in a classroom containing many pupils in the Three Year Program. Teachers, inexperienced in the program, can conceivably forget the aims and techniques, and can allow the larger group to dominate the smaller. There is always a danger that the Four Year Group may be made to adapt itself to the course of studies followed by the others. Classes may be combined to an extent injurious to the slower group. It is therefore possible for pupils designated as Four

Year pupils to be instructed in the same manner as Repeaters, and either repeat work already done, or skip sections of vital importance to them.

To prevent incorrect practices in teaching, the Four Year Program needs very careful organization and supervision by all those responsible for its success. Principals, especially, must be constantly vigilant to see that the spirit of the program is carried out.

It might be noted that in the case of arithmetic the Four Year Group did achieve a mean 2.7 points higher than the Repeater Group.. Although not statistically significant, this higher score might indicate that arithmetic is best learned by the slow, steady, continuous treatment, rather than by repetition of one particularly poor year's work.

UN-MEASURED FACTORS

It must again be emphasized that the Four Year Program exists for other reasons than that of increasing achievement in subject matter. The social and emotional aspects of failure and repetition have often been decried. The undesirable features of failure may not exist in the Four Year Program. This aspect of the program should be examined before a complete picture of its success is

obtained. It may be found that there are many benefits aside from achievement in subject matter.

11. THE FOUR YEAR GROUP AND THE THREE YEAR GROUP

Upon comparing the Four Year Group and the Three Year Group it was found that there was a significant difference between the two groups in each of the subjects measured. It is therefore evident that the extra year of instruction was not sufficient to bring the slow learners up to the same level of achievement that the Three Year pupils reached. It appears that the ratio of four years to three is not realistic. Perhaps the ratio should be five to three. If further study indicates that the four years is inadequate, and an increase in the number of years of the program seems unwise, a modification of the curriculum might be required. This might provide for additional emphasis on basic skills, with a corresponding lowering of requirements in other subjects. A more detailed examination of the achievement in each subject may present valuable information.

ARITHMETIC

The mean score of the Four Year Group, in arithmetic, is 87.3. That of the Three Group is 98.1. The

lower mean, however, does not indicate that the Four Year Program is a complete failure. Upon examination of Figure 1, page 30, it is discovered that approximately 55 percent of the Four Year pupils scored above the lower quartile score of the Three Year Group. It seems reasonable to state that any pupil in a grade who scores above the lower quartile is an acceptable pupil in that grade. On this basis the Four Year Program was at least 55 per cent successful in developing satisfactory Grade 111 pupils over the four year period. Further, if we should accept the premise that only the bottom 15 per cent of a normal class would be considered for failure, we would find approximately 70 per cent of the Four Year Group above this Three Year level.

With these considerations in mind there appears to be a substantial degree of progress achieved in the field of arithmetic. There is an indication that the Four Year Program has operated reasonably well in the instruction of this subject.

READING

In reading, the mean score of the Four Year Group is 12.84, which falls 5.92 points below the Three Year mean of 18.76. Figure 2, page 30, shows that only 35

per cent of the Four Year Group scored above the lower quartile score of the Three Year Group. Only 45 per cent scored above the lower 15 per cent of the Three Year Group.

These figures indicate a much smaller degree of success in reading than in arithmetic. There are indications here that reading may be taught successfully within the program, but some attempt should be made to discover better ways of doing it. As mentioned previously, there is a possibility that the course has not been covered in the manner planned for it in the Four Year Program.

SPELLING

The Four Year mean score in spelling is 16.2 as compared to the Three Year score of 22.1. Here there is a large difference of 5.9 points. As shown by Figure 3, page 31, only 25 per cent of the Four Year Group scored above the lower quartile score of the Three Year Group. Only 35 per cent scored above the bottom 15 per cent of the Three Year Group.

A low degree of success for the program is indicated by these figures. It is possible that spelling is being neglected in the instruction of this group. Serious attention must be given to locating and

remedying the weakness exhibited here.

RECOMMENDATIONS

Some suggestions have already been given regarding the future of the Four Year Program. These may be augmented by several specific recommendations.

1. The Four Year Program should be continued until much more research has been done upon it. This should include a careful survey of social and emotional aspects.

2. An investigation into school practices would show various methods of organization and perhaps find one of particular value.

3. The extent to which teachers adhere to the pattern, as outlined in the program, could have much influence on its success. Proper operation requires study and training on the part of the teacher and the principal. The latter must also organize and supervise to keep the program operating efficiently.

4. The curriculum should be examined to see if curtailment or modification is necessary. It might be possible to increase achievement in the basic subjects by decreasing demands in the others. The basic subjects might be reorganized to stress the most essential aspects.

5. Reading practices should be studied so that improvements could be made in achievement. An attempt should be made to discover the greatest weaknesses of the Four Year Group, and corrective measures should be applied.

6. A similar examination of spelling practices seems necessary. Various teaching methods should be tried, in order to find one, or more, which would be particularly valuable for slow learners.

7. Further studies should be made of the various aspects of the program, as it continues in operation.

CHAPTER VI

SUMMARY

1. THE PROBLEM

The purpose of this study was to evaluate the success of the Four Year Program, in Division 1, of the Calgary Public Schools, as measured by a battery of achievement tests in the subject matter field. There were two questions to be considered.

1. Does the Four Year Program Group achieve in a manner significantly different from the Repeater Group?

2. Does the Four Year Group achieve at a level comparable with the Three Year Group?

The Four Year Program for Division 1 was introduced into the Calgary Public Schools in September, 1952. It was designed for slow learners, to permit them to progress through grades 1, 11 and 111, at a slower rate than the average learners, thus avoiding the need for repetition of a grade. To enable them to do this, the basic subjects in the curriculum of the first three grades were divided into twelve units or levels. The Four Year Group was expected to cover three units each year, for a period of four years.

At the end of this time they would presumably be sufficiently grounded in the basic subjects to proceed to Grade IV.

Candidates for this program were to be selected on a basis of low I.Q., (under 80), or low achievement as measured by the teacher. Mental ages gave a good indication of possible learning readiness, and these measures were used in determining candidates as well.

Since the program has now been in operation for six years, and several groups of pupils have completed it, it should now be possible to obtain a measurement of its success.

Achievement in arithmetic, reading, and spelling was the only aspect measured. Others of importance, such as social and emotional effects, were not considered. Until these are measured, a complete picture of the success of the program will not be obtained.

In this study, Three Year Program refers to the normal program, which takes three years to complete. Four Year Program refers to the special program which requires four years of continuous progress to complete, and Repeater refers to any pupil who took four years because of repeating a grade. Slow learners are designated in the Calgary Public School system as pupils

of low I.Q. or pupils of low achievement.

This study was limited to pupils promoted from Grade III to Grade IV, in June, 1958, in the Calgary Public Schools. No pupils who took more than four years, or less than three years, to complete the division were included. No attempt was made to measure any other factors than achievement in arithmetic, reading, and spelling. This was measured by one test battery given in May, 1958.

11. REVIEW OF RELATED LITERATURE

The literature related to the problem was examined in four aspects, individual differences, grouping, slow learners, and organization for slow learners. It was found that two types of literature exist, the one being based upon observation and experience, and the other upon investigation and experimentation. Both types were considered of value.

In the case of individual differences it was found that there was general acceptance of the concept that all children differ in ability and achievement. Investigators have shown that there is a spread of five or six grades of achievement in a grade seven class. Although recognizing that these differences are so great modern school systems find it impossible to provide

individual instruction. A compromise is made by grouping pupils of similar achievement and ability. In order to group pupils in this manner it is necessary to discover the differences that exist among pupils. This is usually done by means of some standardized intelligence test. In Calgary, the test used is the Detroit Beginning First Grade Intelligence Test. This test was studied and conclusions were reached indicating that it did discriminate the levels of individual ability.

Many experts have advocated grouping as a means of providing classes of similar ability. There is a definite tendency towards providing for as great a degree of homogeneity as possible within each group. This homogeneity is often based upon achievement in the subject matter field in addition to considerations of intelligence. A number of studies have shown that the range of achievement in any group is only lessened to a small extent by homogeneous grouping. In spite of this adverse opinion, the majority of experts favor some form of grouping by ability and achievement. One investigation showed that seven out of eight school officials favored homogeneous grouping, in its organization of grades, and groups within the grades.

Since the Four Year Program was devised for slow learners it is necessary to define the term. Most writers have done this by describing a slow learner as one whose I.Q. lies between about 70 and 80. One writer emphasizes that the term applies only to learning of intellectual things. Another is convinced that much subjective judgment on the part of the teacher is necessary in identifying a slow learner. The Calgary Public School Board suggests that an I.Q. below 80, and low achievement, indicate a slow learner.

The matter of organizing for instruction of slow learners has been given considerable attention. At one time, failure and repetition of a grade was the common practice. Opinion is growing, however, that in many cases repetition is not of much value. Although the practice of repetition still persists, innovations are being tried.

One means of providing for slow learners is to segregate them, either within the class, by means of special classes, or by means of special schools. There are several types of organization on a "multiple-track" plan, where provision is made for all grades of intelligence.

Another approach to the problem is to reorganize the curriculum. One writer states that there are two

methods of doing this, one consisting of lowering requirements, the other being a slowing down of the program, allowing the slow pupil more time to complete it. This is the main feature of Calgary's Four Year Program.

111. SOURCES OF DATA AND METHOD OF GROUPING

All data were obtained from official files of the Calgary Public School Board. The sources consisted of reports dealing with achievement tests, intelligence tests, and year-end promotions.

Achievement test data were made up of scores of all Grade 111 pupils who wrote a battery of tests in May, 1958. The arithmetic test, Measuring Power in Arithmetic, consisted of three sections, Understanding Arithmetic, Using Arithmetic Accurately, and Solving Problems. There was a total raw score of 125 which was used in the data. The Dominion Achievement Test in Silent Reading, a diagnostic test in paragraph reading, was given. Raw scores were again used in all reports, the total being 28. For measuring spelling, the Edmonton Spelling Test for Grade 111 was used. This test had a possible raw score of 40.

Intelligence test data were secured from the California Short Form Test of Mental Maturity. Mental

ages were obtained from these tests.

To determine the type of program each child was following, an examination of promotion reports for each individual school for the years 1955, 1956, 1957, and 1958 was necessary. This provided the names of 2662 pupils in the normal Three Year Program, 139 in the Four Year Program, and 104 Repeaters.

Experimental groups were set up by matching 100 Repeaters with 100 Four Year pupils, matching being done on a basis of sex and mental age. Sixty-two boys and thirty-eight girls were finally selected to form the Repeater Group, with a mean mental age of 112.15 months, and a standard deviation of 11.80. The proportion of boys to girls was determined by the available number of each in the Repeater population. When selected, the Four Year Group consisted of sixty-two boys and thirty-eight girls, with a mean mental age of 112.15 months and a standard deviation of 11.70. The Three Year Group was formed of a stratified random sample of sixty-two boys and thirty-eight girls obtained from the normal population of 2662.

IV. ANALYSIS OF THE DATA

All test scores for the pupils were listed for each experimental group. These scores consisted of

mental age, arithmetic raw score, reading raw score, and spelling raw score. Means and standard deviations were found for each group, in each subject.

In order to compare the matched groups, the Four Year Group and the Repeaters, correlations were found for the normal Three Year Group between mental age and subject scores. The t-test for matched groups was then used to determine significance of differences. It was found that there were no significant differences, at the .05 level, in any of the subjects tested.

The Four Year Group and the Three Year Group were compared using the formula for unmatched groups. Significant differences were found to exist at the .01 level.

As a supplementary means of comparison, cumulative frequency graphs were prepared, showing group achievement in each subject.

V. CONCLUSIONS AND RECOMMENDATIONS

FOUR YEAR GROUP AND THE REPEATERS

The fact that there was no significant difference in achievement in arithmetic, reading or spelling appears to indicate that the Four Year Program is not superior to repetition of a grade. Before accepting this as true, further study should be made to discover if the program is

being adversely influenced by some unknown factor, or factors. There is a possibility that the program is not operating as it was meant to operate. In some instances, a very small group of Four Year pupils is found in a large class of Three Year pupils. Teachers can forget the aims and techniques of the program and can allow the larger group to dominate. There is always a danger that the Four Year Group may be made to adapt itself to the course followed by the other group. Classes may be combined, resulting in Four Year pupils actually being instructed in the same manner as Repeaters, either repeating work already learned, or skipping sections of vital importance to them. To prevent incorrect practices in teaching, the Four Year Program needs careful organization and supervision. Both teachers and principal must be constantly vigilant to see that the spirit of the program is respected.

In the subject arithmetic, there seems to be some superiority on the part of the Four Year Group, since it does achieve a mean 2.7 points higher than the Repeaters. Although not statistically significant, this higher achievement might indicate that arithmetic is best learned by the slow learner in a slow steady continuous method, rather than by repetition of one particularly poor year's work.

There are valuable aspects of the program which have not been measured. The social and emotional effects of failure and repetition of a grade have often been decried. The undesirable features of failure may not exist in the Four Year Program. This aspect should be examined before forming final conclusions regarding the success of the program.

FOUR YEAR GROUP AND THREE YEAR GROUP

It was found that significant differences do exist between the Four Year Group and the Three Year Group, in all subjects examined. It is therefore evident that the extra year of instruction was not sufficient to bring the slow learners up to the Three Year standard. It may be that the ratio of four years to three years is not realistic, and one of five to three might be correct. A modification of the curriculum might be necessary if further study indicates that the four years is insufficient to cover the course.

When the results in arithmetic are examined on the cumulative frequency graph, it is noted that 55 per cent of the Four Year pupils scored above the lower quartile score of the Three Year pupils. 70 per cent of them scored higher than the 15 per cent level of the Three Year pupils. Since Grade 111 pupils scoring

above the 15 per cent level are usually considered for promotion, this would indicate that a large percentage of the Four Year Group did satisfactory work in arithmetic in Grade 111. The program may be considered to have achieved a good degree of success in this subject.

The success attained in reading by the Four Year Group was much less than in arithmetic. Here only 35 per cent scored above the lower quartile of the Three Year Group. Only 45 per cent scored above the 15 per cent level. There is a slight degree of success shown here, but some investigation should be done to discover reasons for the lack of greater achievement.

In spelling only 25 per cent of the Four Year Group scored above the lower quartile of the Three Year Group. Only 35 per cent scored above the lower 15 per cent of the Three Year Group. This indicates a very low rate of success in teaching spelling within the program. A careful investigation should be made for causes of this.

In conclusion several other specific suggestions are given,

1. The Four Year Program should be continued until much more research has been done upon it. This

should include a careful survey of social and emotional aspects.

2. An investigation into school organizational practices would show various methods, and perhaps find one of particular value.

3. Teachers and principal should be well prepared and adhere to the spirit of the program.

4. The curriculum should be examined to see if curtailment or modification is necessary.

5. Reading practices should be studied and improved.

6. A similar examination should be made of spelling practices.

7. Further investigation should be made of the various aspects of the program as it continues in operation.

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